

PROJECT DESCRIPTION

FOR
RYAN CREEK MIGRATION BARRIER REMOVAL PROJECT
RYAN CREEK, A TRIBUTARY OF THE EEL RIVER

ON
RYAN CREEK ROAD
CR 310C MP 0.17
MCDOT Project No.D-0202

COUNTY OF MENDOCINO
STATE OF CALIFORNIA

PREPARED BY
ALEX STRAESSLE
DRAINAGE AND HABITAT CONSERVATION
LAND IMPROVEMENT DIVISION
MENDOCINO COUNTY DEPARTMENT OF TRANSPORTATION (MCDOT)

Alex Straessle
Engineer II
Drainage and Habitat Conservation

DATE



Exhibit 4: 2003 Mitigated Negative Declaration (Ryan Creek)

Title: Ryan Creek Migration Barrier Removal Project

Location: The project is located on Ryan Creek Road (CR 310C) at mile marker 0.17 approximately 5 miles North of the town of Willits, CA just west of Highway 101. Section 24, Township 19 North, Range 14 West, MDBM (USGS 7.5 Minute Willits Quadrangle).

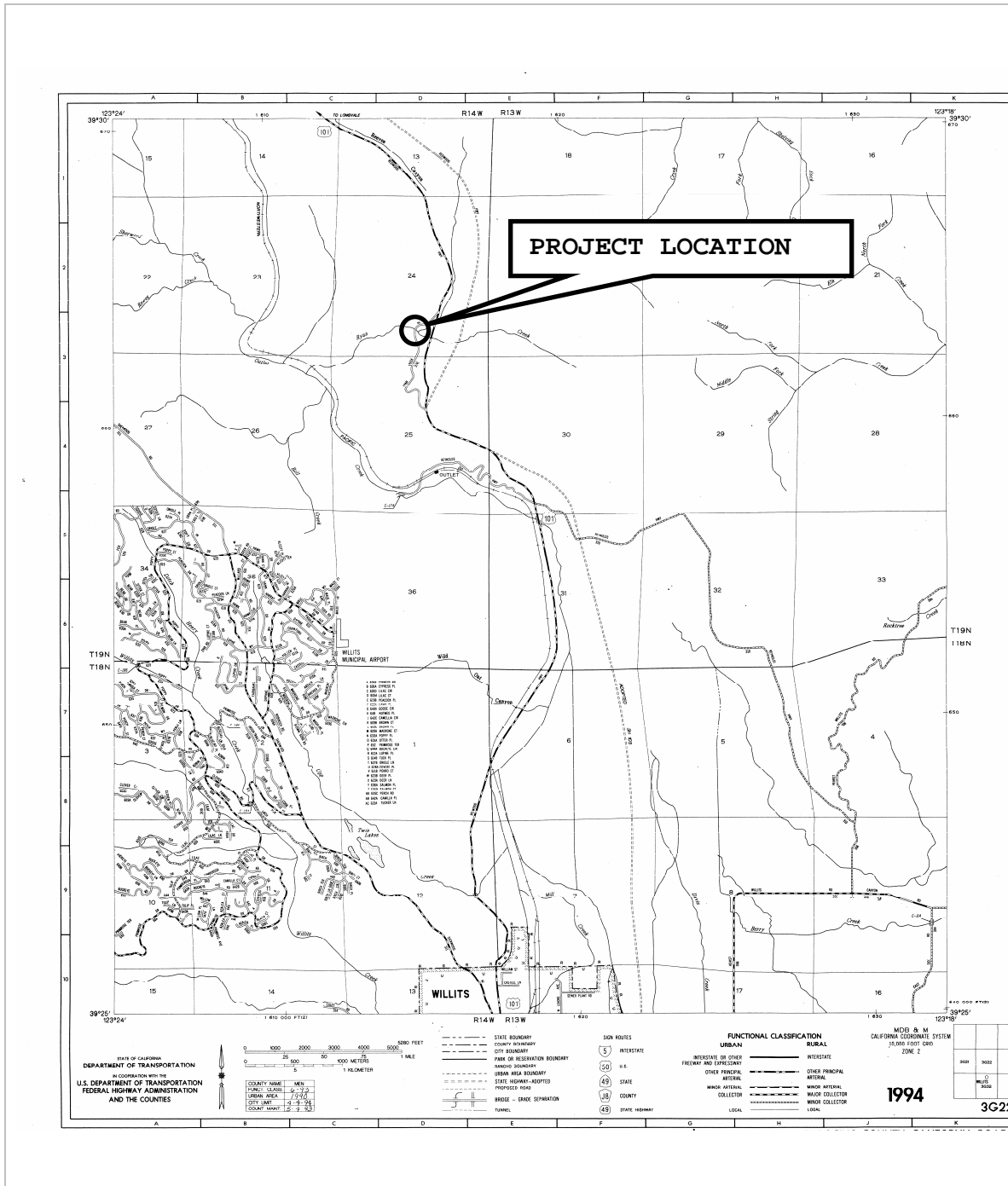


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Project Description:

I. Background

In 1997, the Counties of Del Norte, Humboldt, Siskiyou, Trinity and Mendocino agreed to collaborate on a proactive, positive response to the federal listings of salmon as Threatened species by forming the Five Counties Salmonid Conservation Program (5C). The goal was to seek opportunities to contribute to the long-term recovery of salmon and steelhead in Northern California. From 1998 to 2004, the 5C funded, through a grant from the CDFG, Ross Taylor, a fisheries biologist, to evaluate and rank Mendocino County road stream crossings for fish passage ability (*FINAL REPORT: COASTAL MENDOCINO COUNTY CULVERT INVENTORY AND FISH PASSAGE EVALUATION*, 2001). Taylor used inventory methods and protocols consistent with CDFG standards and protocols. The tasks for that project were to conduct an inventory of stream crossings on Mendocino County roads, evaluate juvenile and adult fish passage, and develop a ranking matrix that prioritizes corrective treatments to provide unimpeded fish passage. The inventory was limited to the anadromous reaches of streams known historically and/or currently to support runs of coho salmon, Chinook salmon and steelhead. The inventory process identified Ryan Creek along Ryan Creek Road in the Eel River watershed as a priority sight (#2 of 54 sites visited in Mendocino County).

Ryan Creek flows through Outlet Creek directly into the Eel River just below Ryan Creek Road. The surrounding area is covered by coniferous and hardwood forests in a steep terrain ranging from 1,400 to 2,200 feet in elevation. The drainage area above the culvert at Ryan Creek and Ryan Creek Road is 2.1 square miles, with 15,000 feet of useable habitat. Outlet Creek is identified as one of the highest priority coho watersheds identified in the *Recovery Strategy for California Coho Salmon* (2004 CDFG).

II. Identification of Problem

The existing culvert is a 10-foot by 6-foot concrete box, 82-foot long and is proposed for full replacement with a concrete arch structure set on concrete footings. The existing culvert also has concrete wingwalls on both upstream and downstream ends and a concrete apron at the outlet. Using the FishXing software package, Ross Taylor and Associates (Final Report: Coastal Mendocino County Culvert Inventory and Fish Passage Evaluation, March 15, 2001) identified the Ryan Creek culvert as 20 % passable for adults (coho salmon, Chinook salmon and steelhead) and a 100% barrier for all age classes of juveniles due to excessive velocities and entry jump at the outlet. The broken concrete apron at the outlet has also been identified as a major impediment to fish migration. There is approximately 15,000 feet of potential fish bearing habitat above the Ryan Creek crossing, with Caltrans crossings located ~500 feet upstream (these crossings are currently in the design stage for replacement and retrofit to improve passage).

III. Project Purpose and Alternatives

The project objective is to allow unimpeded adult and juvenile fish passage through the structure to upstream habitat. Various options were considered to improve passage at this site and the alternative of replacing the existing culvert with a properly sized arch structure was selected. The structure will be designed to meet the National Marine Fisheries Service (NMFS) Guidelines by allowing anadromous fish passage at all life stages and be capable of passing the 100 year event without overtopping. The structure will be designed through the active channel design method; set at 0% slope with a width

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of 1.5 times the active channel width of 13 feet. Ryan Creek Road is 1.05 miles long and accessible from both ends, so a road closure will be required during the 31-day construction period sometime between July 15 and October 15, 2007. This option provides for unimpeded adult and juvenile salmonid fish passage through the structure and further provides enough capacity for the 100 year storm event.

Project Design Basis Discussion:

I. Watershed Conditions

There is approximately 1,340 acres or 2.09 square miles of watershed above the Ryan Creek crossing. The surrounding area is covered by coniferous and hardwood forests in steep terrain ranging from 1,400 to 2,200 feet in elevation. Soils are predominately deep well drained loams. Property ownership is predominately private with a 40-acre minimum parcel size.

II. Stream Conditions

Ryan Creek is tributary to Outlet Creek, tributary the Eel River. There is 15,000 feet of useable stream habitat above the Ryan Creek Crossing. There are two other road crossings approximately 500 feet upstream on Highway 101.

III. Hydrology

There is approximately 1,340 acres or 2.1 square miles of watershed above the Ryan Creek crossing. For the purposes of our analysis we placed the watershed in hydrologic group "B" 45% good and 55% poorer due to past logging. The SCS TR55 hydrology model, Rational method, and the USGS 77-21 empirical equations were used to establish design flows. Based on our analysis and averages of the three methods we established the following design flows:

Probability	Rational Method	TR 55	USGS 77-21	Average
1% - 100 year event	940	920	858	906 cfs.
4% - 25 year event	710	510	560	593 cfs.
10% - 10 year event	590	350	411	450 cfs.

The work plan is to replace the existing concrete box culvert with a open-bottom, pre-manufactured arch structure of adequate size that will allow anadromous fish passage at all life stages. The structure is designed to meet National Marine Fisheries Service (NMFS) Guidelines for fish passage and is 1.5 times the active channel width of 13 feet. The construction of this 19.5' wide x 9' high x 82' long structure will help with the recovery of depleted salmonid populations and demonstrate MCDOT actions that can be accomplished in conjunction with the Five-County salmonid restoration effort.

IV. Hydraulics

The existing culvert is a 10-foot by 6-foot concrete box, 82-foot long set at 2.7 % slope. The existing box culvert is undersized with a HW/D ratio of 1 with approximately a 12 year recurrence interval. Ryan Creek road is estimated to overtop on greater than a 250 year storm discharge.

Exhibit 4: 2003 Mitigated Negative Declaration (Ryan Creek)

The structure is adequately sized to pass the 100-year design storm and meet the National Marine Fisheries Service Guidelines for Salmonid Passage at Stream Crossings through the active channel design method that is intended to size the structure sufficiently large and embedded deep enough into the channel so as to allow the natural movement of bedload and formation of a stable bed inside the structure.

The existing active channel width was measured to be 13 feet, thus by the NMFS guidelines the structure will need to be 1.5 times that natural width (or 19.5 feet) and set at zero slope. Structure sizing by the manufacturer resulted in the design of a pre-manufactured concrete bottomless arch structure with a span of 19.5 feet, rise of 9 feet and length of 82 feet, and includes wing-walls.

V. Geomorphology

In addition to removal of a fish barrier the project is intended to affect the geomorphology of the stream (movement of stream rock and sediment, "bedload", to form the topography of the stream channel bottom) by restoring it to a more natural condition. The presence of the existing culvert structure has, over time, created the unnatural condition of an outlet plunge pool and an aggradation of bedload upstream. The installation of the proposed arch structure will, over time, allow more natural geomorphology to distribute bedload and form a stable channel bed upstream, downstream, and inside the new arch structure.

Please refer to attached project map and photographs of existing conditions.

Exhibit 4: 2003 Mitigated Negative Declaration (Ryan Creek)

Site #8: Ryan Creek/Ryan Creek Road; Outlet Creek/South Fork Eel River **Ranking: #2 = High Priority**

Location: County Map #3G22 . T19N, R14W, Section 24.

Culvert Type: Concrete box with downstream apron and concrete wing-walls on both upstream and downstream ends. **Dimensions:** 10.0' W x 6.0' H **Length:** 82.2' **Slope:** 2.73% **Modifications:** None

Fill Estimate: 7,975 cubic yards **Overall condition:** Poor; outlet apron cracked and slumped (see photo).

Sizing: Undersized; HW/D = 1 on a storm flow with approximately a 12-year recurrence interval. Ryan Creek Road is overtopped on greater than a 250-year storm discharge.

Barrier Status: For the range of migration flows ($Q_{sp} - Q_{hp}$), FishXing determined crossing is 20% passable for adults (coho salmon, chinook salmon, and steelhead). For juveniles (all age classes) = 100% barrier due to excessive velocities and entry jump required at outlet. Broken concrete apron at outlet is a major impediment to fish migration (Harris, pers. comm.).

Additional Road Crossings: Downstream, none. Upstream about 500': Highway 101 (two crossings: both approximately 150' long; 5.0' diameter CSPs; north fork is perched 2.5' = probable 100% barrier; south fork is backwatered; both in poor condition and undersized. Private road crossing about 450' upstream of Highway 101 southern crossing is a 100' long, 5.0' CSP perched about 2.0'.

Habitat: Partially surveyed in 1995 by CDFG habitat-typing crews (no access allowed on northern fork). Quantity = approximately 15,000' of potential fish-bearing habitat. Quality = Good; dense riparian of mostly hardwoods (86%); abundant pools with depths > 2.0'; relatively unembedded gravels; lack of LWD and pool habitat complexity. Three age-classes of juvenile steelhead, y-o-y coho, and adult Pacific lamprey observed only below culvert at Ryan Creek Road.

Preferred Treatment: Replace existing crossing with a properly-sized bridge or arch-culvert set on concrete footings. Removal of crossing is also an option since access to Highway 101 is possible in either direction.



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Site #8: Ryan Creek/Ryan Creek Road: Outlet Creek/South Fork Eel River

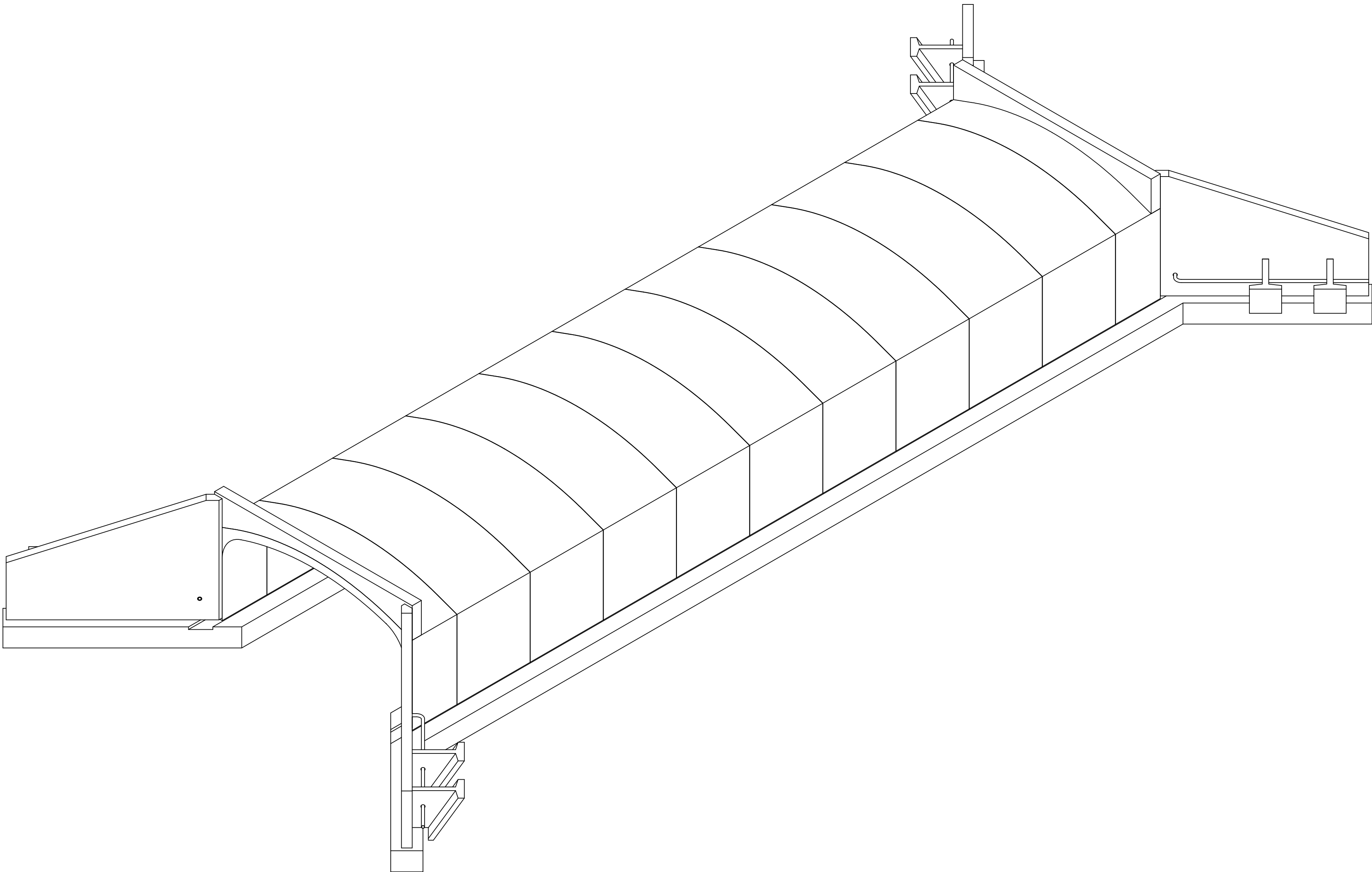


Ryan Creek

Mendocino County

CA

Upstream



ISOMETRIC VIEW

Downstream

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Preliminary Drawings
prepared for:
Jason
Leach



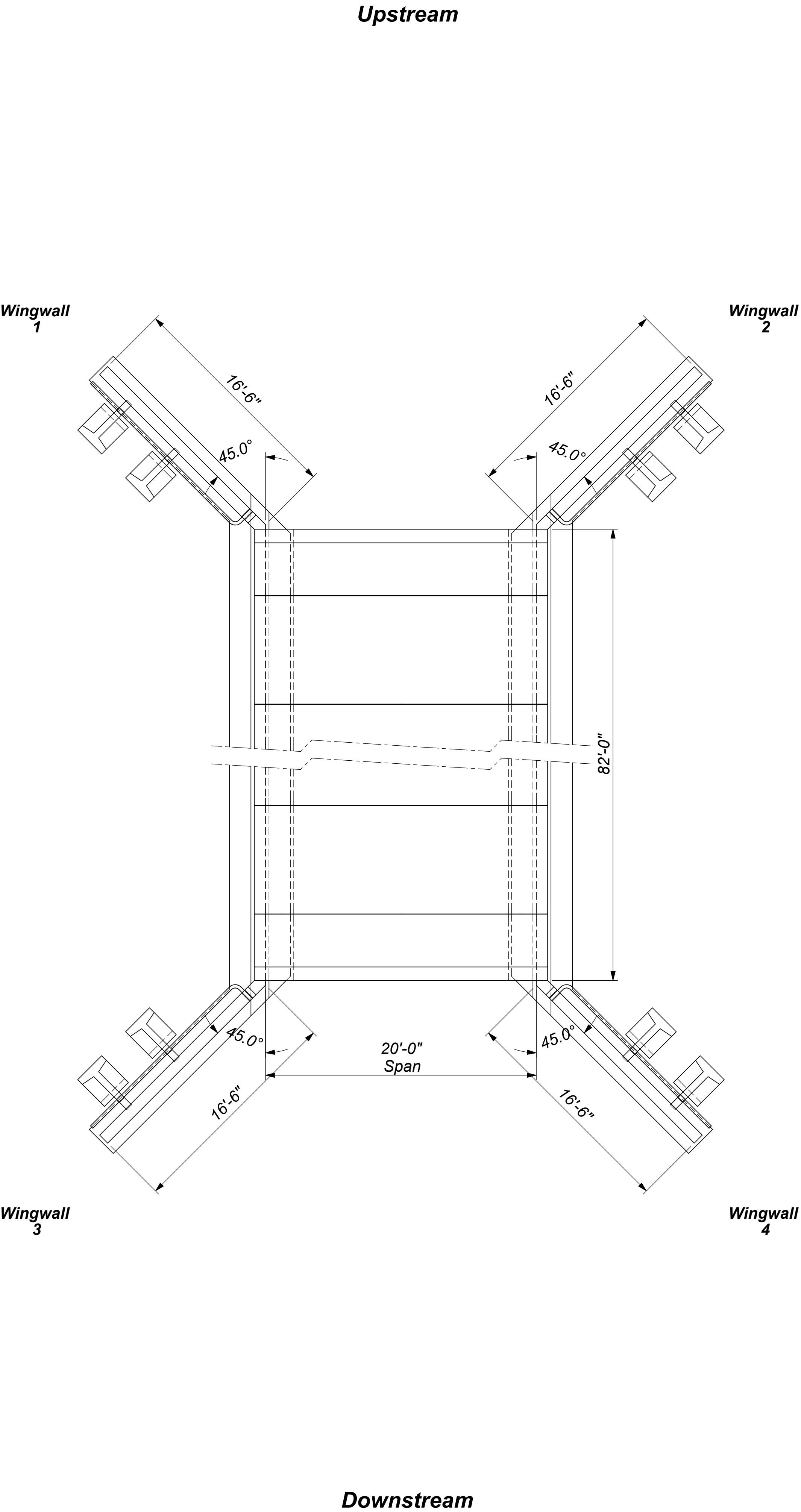
3100 Research Blvd, P.O. Box 20266 Dayton, Ohio 45420-0266
Phone: (603) 526-3999 Fax: 937-264-8365
www.con-span.com

Mendocino County

CA

Ryan Creek

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BRIDGE PLAN

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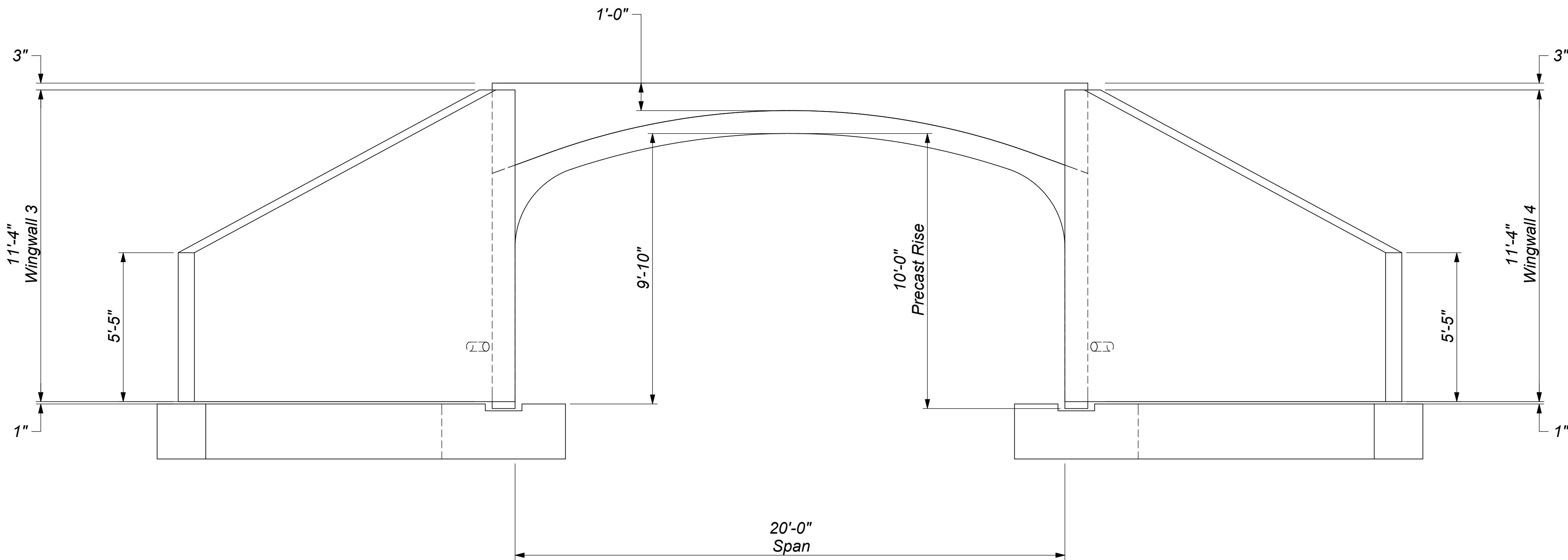


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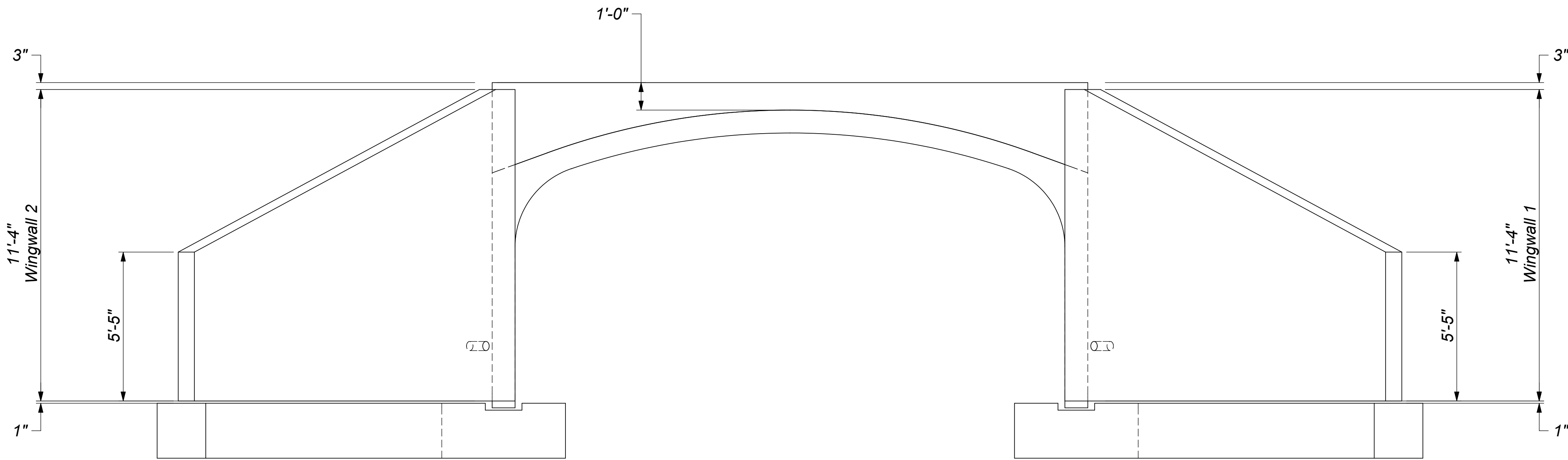
3100 Research Blvd, P.O. Box 20286 Dayton, Ohio 45420-0286
Phone: (603) 526-3999 Fax: 937-264-8365
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DOWNSTREAM END ELEVATION



UPSTREAM END ELEVATION

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3100 Research Blvd, P.O. Box 20266 Dayton, Ohio 45420-0266
Phone: (603) 526-3999 Fax: 937-254-8365
www.con-span.com

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Jason
Leach

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